What is claimed is:

1. **A process for the recognition** of a polyphase machine (1) connected to a converter (10) which comprises a stator and a rotor (1a, 1b), in particular prior to an active productive operation of the machine, with the following steps of the process
   (a) connecting of the polyphase machine with its several electric phases to the converter (10);
   (b) supplying of a first test signal from the converter (10) to at least one, preferably a few of the several electric phases of the connected polyphase machine (1);
   (c) measuring of at least one causal consequence of the first test signal;
   (d) evaluating of the measured result as a causal consequence in order to obtain a first measuring value (r1);
   (e) repeating of at least once steps (b) to (d) for at least one further test signal in order to obtain at least one further causal consequence and at least one further measuring value (r2);
   (f) allocating of these (at least) two measuring values to a comparison function (60, 50);
   (g) comparing of the comparison function with at least one of several reference functions (60a, 60b, 50a, 50b), each of which representing one type of a polyphase machine, in particular two reference function not representing the same type of machines, in order to select the reference function which is most similar to the reference function (50, 60);
   (h) stipulating of (25) one of several available system programs (12a, 12b, 12c) in a control (11) of the converter (10) by means of the selected reference function;

   to adapt the converter (10) to the machine to be activated by it.

2. The process according to claim 1, wherein the comparison function for at least one, preferably all windings (electric phases) of the polyphase machine is created with several measuring results of several test signals, said several measuring results gradually forming the comparison function by means of an expanding and/or supplementing.

3. The process according to claim 2, wherein the comparison function is compared with several reference functions in order to determine the most similar thereof and the machine type appertaining to it.

4. The process according to claim 3, wherein at least two reference functions do not represent the same type of polyphase machine.

5. The process according to claim 1 or 3, wherein one of the reference functions (50a) represents an asynchronous machine as a polyphase machine.

6. The process according to claim 5, 3 or 1, wherein one of the reference functions (60a) represents a synchronous machine as a polyphase machine.

7. The process according to claim 1, wherein the repetition according to feature (e) at at least one other electric phase (winding) of the machine (1) is implemented as steps (b) to (d) for obtaining the first measuring value (r1).

8. The process according to claim 1, wherein the converter comprises a control part (11) and a power part (10).

9. The process according to claim 1, wherein the converter is a power device which provides power actuating signals via several electric output phases (n, 4) and obtains the actuating signals from an intermediate circuit, which is fed from a rectifier from a mains (9, N).

10. The process according to claim 1, wherein the comparison function (60, 50) and the at least one reference function (50a, 60a) represent the same physical magnitude as a sequence of measuring values (r1, r2) over the same system magnitude (α).

11. A process according to claim 10, wherein the physical magnitude is a resistance or impedance (Z) over a stator (field) angle (α) of the connected polyphase machine.

12. The process according to claim 10, wherein a course of the physical magnitude as a measuring value sequence in the reference function (50a, 50b) is substantially constant over a stator angle (α).

13. The process according to claim 10 or 12, wherein at least one reference function (50a, 50b) does not have any distinct maximum and any distinct minimum.

14. The process according to claim 10, wherein a course of the physical magnitude of at least one reference function has at least one distinct minimum and at least one distinct maximum (60a, 60b).

15. The process according to claim 11, wherein at least the majority of the measured resistance and impedance values (r1, r2, ...), which are ascertained as measuring values, if plotted over the stator angle (α) are within a band (b) which is formed by not more than substantially ±20% of a mean value which results from the measuring values, in particular within a band of less than ±10% of the mean value.

16. The process according to any of the preceding claims 11 to 15, wherein the measuring magnitude from the measured causal consequence of the first test signal is another physical magnitude as an impedance or resistance.

17. The process according to claim 1 to 10, wherein several measuring results are evaluated and are allocated to the comparison function as several measuring values (50, 60), the evaluation including a conversion to determine a measuring value from the measuring result, e.g. a resistance or impedance calculation from a current measurement.

18. The process according to claim 1, wherein the several system programs (12a, 12b, 12c) stand for several types of polyphase machines (1), in particular as a regulator program part, a control program part or a monitoring program part.

19. The process according to claim 1, wherein the at least one causal consequence is one or several of current, voltage, rotary speed or change in position.

20. The process according to claim 1, wherein the at least first test signal is a stationary alternating signal, a pulse signal or a short-term frequency alternating signal.

21. The process according to claim 20, wherein the alternating signal has a frequency of at least 10 Hz, in particular a multiple thereof, in order not to substantially change a rotor of the polyphase machine in its rotational position (φ), while the alternating signal is present at the electric phases or windings of the polyphase machine (1).

22. The process according to claims 1, 2 or 20, wherein a respective test signal is impressed on the several phases at the same time and is a respective polyphase test signal.

23. The process according to claim 20 or 21, wherein the first test signal has a frequency of more than substantially 100 Hz.

24. The process according to claims 1, 20 or 23, wherein an alternating basic signal of less than substantially 10 Hz as the polyphase actuating signal lets the rotor (1b) of the polyphase machine (1) slowly rotate in its rotational position (φ) and several test signals are modulated onto the polyphase regulation variable at a time distance.

25. The process according to claim 1 or 20, wherein the rotor (1b) of the polyphase machine is moved to several, not equal (different) rotor positions (φ1, φ2) with an actuating signal in order to apply a respective test signal to the electric phases while the rotor remains at a respective rotational position and to measure the respective causal consequence for the evaluation to several measuring values for the comparison function (50, 60).

26. The process according to claim 25, wherein movement to a plurality of rotor positions (φ), in particular more than 50 rotational positions of the polyphase machine, take place and are measured as regards the respectively causal consequence at a respective test signal.

27. The process according to claim 1, wherein steps (b) to (d) a repeated for a further test signal to obtain a further measuring value (r2).

28. The process according to claim 27, wherein the repetition is carried out repeatedly until a comparison function (50, 60) provided with several measuring values is formed, which is compared with the at least one reference function (60a, 60b, 50a, 50b) according to feature (e) of claim 1.

29. The process according to claim 27 or 28, wherein each further polyphase test signal as a second, third, etc. test signal is a polyphase signal for forming several flow position vectors in the stator system (α) of the machine (1), said vectors being located at different angular positions (α1, α2, α3) of the stator, with practically no movement of the rotor (1b).

30. A process for preparing a recognition of a type of a connected polyphase machine (1) as a machine with a rotor (1b) and a stator (1a), said machine being activatable by a converter (10, 11) with actuating signals (4) for several electric phases; wherein
   - the machine (1) connected to the converter is acted upon by a plurality of polyphase test signals via a polyphase electric winding of the machine at a plurality of stator angles ($\alpha 1$, $\alpha 2$, $\alpha 3$), with substantially no movement of the rotor (1b);
   - a measuring value (r1, r2; z_i) is determined from the measured causal consequences of a respective polyphase test signal at a respective angular stator position of the stator of the connected polyphase machine;
   - a plurality of measuring values ($Z_i(\alpha)$) determined in this fashion establish a comparison function (60, 50);

   to prepare a determination of the type of the connected machine (1).

31. The process according to claim 30, wherein the causal consequence of a respective test signal at a respective stator angle (α; $\alpha 1$, $\alpha 2$) are current values and a measuring value determined therefrom is a respective resistance or impedance value (r_i, z_i) at a respective angular stator position (α_1).

32. The process according to claim 31, wherein a plurality of resistance or impedance values (z_i) determined in this fashion is established as an "electric rotary angle" by means of the plurality of angular stator positions (α_1) to form the comparison function as a function ($Z(\alpha)$) over the electric rotary field angle (α).

33. The process according to claim 1 or claim 30, wherein the at least first test signal and all further test signals in a three-phase system of a three-phase current (N) are given.

34. The process according to claim 1, 30 or 33, wherein each test signal is a three-phase signal which forms a flow vector in the angular stator system (α) and, in the case of a plurality of dissimilar angles ($\alpha 1$, $\alpha 2$, $\alpha 3$), test signals are given for the formation of a measuring value function (50, 60) as a comparison function of the connected machine (1), which can be stored over the stator angle (α) or be plotted.

35. The process according to claim 34, wherein the test signals are such that the rotor was not rotated or only rotated a bit until a complete comparison function had been completed.

36. The process according to claim 1 or 30, wherein the electric angles ($\alpha 1$, $\alpha 2$) of several test signals and the mechanical angular position (φ) of the rotor (1b) relative to each are changed, in particular moved, in order to be able to detect different positions of the rotor with respect to the angles of the test signals from the stator.

37. The process according to claim 1, 30 or 36, wherein the angles (angular positions) relate to a pair of poles.

38. The process according to claim 1 or 36, wherein the angular differences between adjacent angles of two test signals are less than 10°, in particular less than 3°.

39. The process according to claim 1 or 36, wherein one direction of movement of a test signal during the establishing of the comparison function (50, 60) changes repeatedly in order to minimize an effective rotation of the rotor (1b).

40. A device that is operable in accordance with any of the preceding process claims.

41. A process for the recognition of a polyphase machine (1) connected to a converter (10), which comprises a stator and a rotor (1a, 1b), in particular prior to an active productive operation of the machine, with the following steps of the process
   (a) connecting of the polyphase machine with its several electric phases to the converter (10);
   (b) supplying of a first test signal from the converter (10) to at least one, preferably a few of the several electric phases of the connected polyphase machine (1);
   (c) measuring of at least one causal consequence of the first test signal;
   (d) evaluating of the measured result (of the causal consequence) in order to obtain a first measuring value (r1, r2) and allocating of this measuring value to a comparison function (60, 50);
   (e) comparing of the comparison function with at least one of several reference functions (60a, 60b, 50a, 50b), each of which representing one type of a polyphase machine, in particular two reference functions do not represent

the same type of machines in order to select the reference function which is most similar to the comparison function (50, 60);

(h) stipulating of (25) one of several available system programs (12a, 12b, 12c) in a control (11) of the converter (10) by means of the selected reference function;

to adapt the converter (10) to the machine to be activated by it.

42. The process according to claim 41, wherein the comparison function for all windings (electric phases) of the polyphase machine is created with several measuring results of several test signals, said several measuring results gradually forming and/or expanding the comparison function.

43. The process according to claim 42, wherein the comparison function is compared with several reference functions in order to determine the most similar thereof and the machine type appertaining to it.

44. The process according to claim 43, wherein at least two reference functions do not represent the same type of polyphase machine.

45. The process according to claim 41 or 43, wherein one of the reference functions (50a) represents an asynchronous machine as a polyphase machine.

46. The process according to claim 45, 43 or 41, wherein one of the reference functions (60a) represents a synchronous machine as a polyphase machine.

47. The process according to claim 46, wherein one of the reference functions represents a synchronous generator as a synchronous machine.

48. The process according to claim 41, wherein the converter comprises a control part (11) and a power part (10).

49. The process according to claim 41, wherein the converter is a power device which provides power actuating signals during several electric output phases (n, 4) and obtains the actuating signals from an intermediate circuit, which is fed from a rectifier from a mains (9, N).

50. The process according to claim 41, wherein the comparison function (60, 50) and the at least one reference function (50a, 60a) represents the same physical

magnitude as a sequence of measuring values (r1, r2) over the same system magnitude (α).

51. A process according to claim 50, wherein the physical magnitude is a resistance or impedance (Z) over a stator angle (α) of the connected polyphase machine.

52. The process according to claim 50, wherein a course of the physical magnitude as a measuring value sequence in the reference function (50a, 50b) is substantially constant over a stator angle (α).

53. The process according to claim 50 or 52, wherein at least one reference function (50a, 50b) does not have any distinct maximum and any distinct minimum.

54. The process according to claim 50, wherein a course of the physical magnitude of at least one reference function has at least one distinct minimum and at least one distinct maximum (60a, 60b).

55. The process according to claim 41, wherein at least the majority of the measured resistance and impedance values (r1, r2, ...), which are ascertained as measuring values, if plotted over the stator angle (α), are within a band (b) which is formed by not more than substantially $\pm$20% of a mean value which results from the measuring values, in particular within a band of less than $\pm$10% of the mean value.

56. The process according to any of the preceding claims 41 to 45, wherein the measuring magnitude from the measured causal consequence of the first test signal is another physical magnitude as an impedance or resistance.

57. The process according to claim 41 to 50, wherein several measuring results are evaluated and are allocated to the comparison function as several measuring values (50, 60), the evaluation including a conversion to determine a measuring value from the measuring result, e.g. a resistance or impedance calculation from a current measurement.

58. The process according to claim 41, wherein the several system programs (12a, 12b, 12c) stand for several types of polyphase machines (1), in particular as a regulator program part, a control program part or a monitoring program part.

59. The process according to claim 41, wherein the at least one causal consequence are one or several of current, voltage, rotary speed or change in position.

60. The process according to claim 41, wherein the at least first test signal is a stationary alternating signal, a pulse signal or a short-term frequency alternating signal.

61. The process according to claim 60, wherein the alternating signal has a frequency of at least 10 Hz, in particular a multiple thereof, in order not to substantially change a rotor of the polyphase machine in its rotational position (φ), while the alternating signal is present at the electric phases or windings of the polyphase machine (1).

62. The process according to claims 41, 42 or 60, wherein a respective test signal is impressed on the several phases at the same time and is a respective polyphase test signal.

63. The process according to claim 60 or 61, wherein the first test signal has a frequency of more than substantially 100 Hz.

64. The process according to claims 41, 60 or 63, wherein an alternating basic signal of less than substantially 10 Hz as the polyphase actuating signal lets the rotor (1b) of the polyphase machine (1) slowly rotate in its rotational position (φ) and several test signals are modulated onto the polyphase regulation variable at a time distance.

65. The process according to claim 41 or 60, wherein the rotor (1b) of the polyphase machine is moved to several, not equal (different) rotor positions ($\varphi 1$, $\varphi 2$) with an actuating signal in order to apply a respective test signal to the electric phases remaining at a respective rotational position and to measure the respective causal consequence for the evaluation to several measuring values for the comparison function (50, 60).

66. The process according to claim 65, wherein movement to a plurality of rotor positions (φ), in particular more than 50 rotational positions of the polyphase machine, takes place and are measured as regards the respectively causal consequence at a respective test signal.

67. The process according to claim 41, wherein steps (b) to (d) a repeated for a further test signal to obtain a further measuring value (r2).

68. The process according to claim 67, wherein the repetition is carried out repeatedly until a comparison function (50, 60) provided with several measuring values is formed, which is compared with the at least one reference function (60a, 60b, 50a, 50b) according to feature (e) of claim 1.

69. The process according to claim 67 or 68, wherein each further polyphase test signal as a second, third, etc. test signal is a polyphase test signal for forming several flow position vectors in the stator system (α) of the machine (1), said vectors being located at different angular positions ($\alpha 1$, $\alpha 2$, $\alpha 3$) of the stator with practically no movement of the rotor (1b).

70. The process according to claim 1, wherein the machine (1) is already coupled at a power take-off side via a shaft (2), whereas at least steps (b) to (f) are implemented.

71. The process according to claim 1, wherein the machine (1) practically does not rotate during a recognition phase with at least non-recurring or repeated steps (b) to (f).

72. The process according to claim 1, wherein the supplying of further test signals takes place at a respectively different electric angular position (α) of the stator field.

73. The process according to claim 72, wherein the test signals are equal.

* ** * *